What Is Claimed Is:

1. A process for improving the performance characteristics of a catalyst, comprising:

a) providing a catalyst comprising a mixed metal oxide having a base composition empirical formula $A_aD_bE_cX_dO_e$,

wherein A is at least one element selected from the group consisting of Mo and W, D is at least one element selected from the group consisting of V and Ce, E is at least one element selected from the group consisting of Te, Sb and Se, and X is at least one element selected from the group consisting of Nb, Ta, Ti, Al, Zr, Cr, Mn, Fe, Ru, Co, Rh, Ni, Pt, Sb, Bi, B, In, As, Ge, Sn, Li, Na, K, Rb, Cs, Fr, Be, Mg, Ca, Sr, Ba, Ra, Hf, Ag, Pb, P, Pm, Eu, Gd, Dy, Ho, Er, Tm, Yb and Lu; and, when a = 1, b = 0.01 to 1.0, c = 0.01 to 1.0, d = 0.01 to1.0, and e is dependent on the oxidation state of said other elements; and

b) vapor depositing onto said catalyst at least one dopant metal for improving catalytic performance.

2. The process according to claim 1, wherein said vapor depositing of said dopant metal is done by sputter doping with at least one dopant selected from the group consisting of Pd, Au, Pd-Au alloys, Ga, Cu, Ag, Ni, Zn, Pr, Re, Ir, Nd, Y, Sm, Tb, In, Bi and Se.

3. The process according to claim 2, wherein said dopant metal is at least one dopant selected from the group consisting of Pd, Au and Pd-Au alloys.

4. The process according to claim 3, wherein said dopant metal is a Pd-Au alloy that includes gold and palladium in a ratio of 1:5 to 5:1.

5. The process according to claim 1, wherein said vapor deposition is accomplished by physical vapor deposition.

6. The catalyst composition produced according to claim 1, wherein said catalyst composition enables at least 1.1 times the conversion of alkane or alkane/alkene starting material gas in a vapor phase catalytic partial oxidation reaction as compared with an undoped catalyst composition of like base composition empirical formula.

7. The catalyst composition produced according to claim 1, wherein said catalyst composition enables at least 1.5 times the conversion of alkane or alkane/alkene starting material gas in a vapor phase catalytic partial oxidation reaction as compared with an undoped catalyst composition of like base composition empirical formula.

8. The catalyst composition according to claim 1, wherein said catalyst composition enables at least 1.1 times the yield of reaction product in a vapor phase catalytic partial oxidation reaction of alkane or alkane/alkene to acrylic acid as compared with an undoped catalyst composition of like base composition empirical formula.

9. A process for producing an unsaturated carboxylic acid, which comprises subjecting an alkane or a mixture of an alkane and an alkene to a vapor phase catalytic partial oxidation reaction in the presence of a catalyst produced by the process according to claim 1.

10. A process for producing an unsaturated nitrile, which comprises subjecting an alkane, or a mixture of an alkane and an alkene, and ammonia to a vapor phase catalytic oxidation reaction in the presence of a catalyst produced by the process according to claim 1.

11. A process for preparing a catalyst, comprising:

a) vapor depositing one upon the other a plurality of thin films, each thin film containing at least one of the elements A, D, E and X to form a composite of A, D, E and X, wherein A is at least one element selected from the group consisting of Mo and W, D is at least one element selected from the group consisting of V and Ce, E is at least one element selected from the group consisting of Te, Sb and Se, and X is at least one element selected from the group consisting of Nb, Ta, Ti, Al, Zr, Cr, Mn, Fe, Ru, Co, Rh, Ni, Pt, Sb, Bi, B, In, As, Ge, Sn, Li, Na, K, Rb, Cs, Fr, Be, Mg, Ca, Sr, Ba, Ra, Hf, Ag, Pb, P, Pm, Eu, Gd, Dy, Ho, Er, Tm, Yb and Lu;

b) calcining said plurality of thin films to form a catalyst comprising a mixed metal oxide having a base composition empirical formula $A_aD_bE_cX_dO_e$ wherein A, D, E and X are as previously defined, O is oxygen and, when a = 1, b = 0.01 to 1.0, c = 0.01 to 1.0, d = 0.01 to1.0, and e is dependent on the oxidation state of said other elements.

12. The process according to claim 11, wherein said vapor deposition is accomplished by chemical vapor deposition.

13. The process according to claim 11, wherein said vapor deposition is accomplished by physical vapor deposition.

14. A process for preparing a catalyst, comprising:

vapor depositing, one upon the other, a plurality of thin films, each thin film containing at least one of the elements Mo, V, Nb and X, to form a composite of Mo, V, Nb and X, where X is at least one element selected from the group consisting of Ta, Ti, Al, Zr, Cr, Mn, Fe, Ru, Co, Rh, Ni, Pt, B, In, Ce, As, Ge, Sn, Li, Na, K, Rb, Cs, Fr, Be, Mg, Ca, Sr, Ba, Hf, Pb, P, Pm, Eu, Gd, Dy, Ho, Er, Tm, Yb, Lu, Au, Ag, Re, Pr, Zn, Ga, Pd, Ir, Nd, Y, Sm, Tb, Cu and Sc; and

calcining said composite to form a catalyst. .

15. A process for preparing a catalyst, comprising the steps of:

vapor depositing, one upon the other, a plurality of thin films, each thin film containing at least one of the elements Mo, V, Te and X^1, to form a composite of Mo, V, Te and X^1, where X^1 is at lewast one eleemnt selected from the group consisting of Sc, Y, La, Re, Ir, Cu, Ag, Au, Zn, Ga, Si, Ge, As, Pb, S, Se, Sn and Bi; and

calcining said composite to form a catalyst.